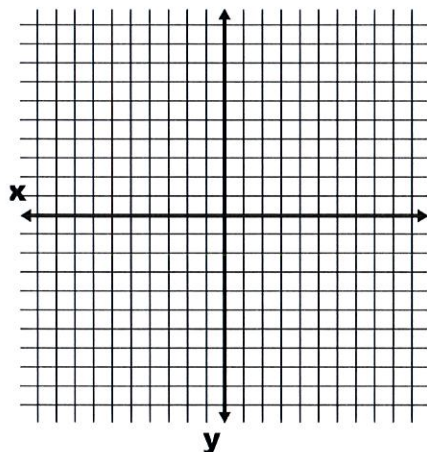


Algebra 2Quadratics Day 4: Graphing Parabolas in Vertex Form

Name: \_\_\_\_\_

Date: May 6, 2015

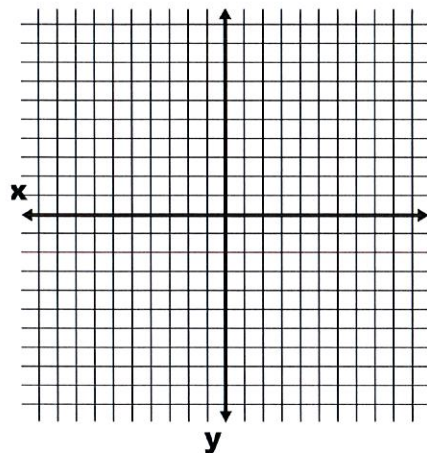
On the graph below, draw the graph of the parent function  $f(x) = x^2$ .



Now we are going to move this parabola using transformations we already know.

In a different colored pen or marker, draw the function  $g(x) = (x - 3)^2 - 4$ .

Let's do one more. On the graph below, draw the graph of the parent function  $f(x) = x^2$ .



In a different colored pen or marker, draw the function  $g(x) = (x + 1)^2 + 2$ .

**What happened when you transformed  $f(x)$ ?**

**Vertex form:**  $f(x) = a(x - h)^2 + k$

How can you use vertex form to predict:

- Concave up or concave down?
- The number of x-intercepts?

Notes about the form:

**PART 1:**

For each, state how the graph would compare to  $f(x) = x^2$ . (Meaning: describe transformations...) More specifically, do the following:

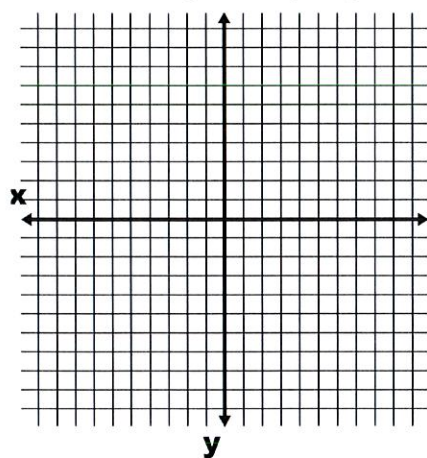
- State the vertex.
- Determine whether the vertex lies above, below, or on the x-axis, and write how you know.
- Determine whether the parabola is concave up or concave down, and why.
- Use the previous 2 bullet points to determine how many x-intercepts the graph must have and explain why.
- Determine whether the parabola has been shifted to the left or right, and if so, state how many units.
- Determine whether the parabola has been shifted up or down, and if so, state how many units.
- Determine how wide the parabola opens, and why.
- Determine the parabola's range.
- Draw the graph.

$$f(x) = -(x - 2)^2 + 4$$

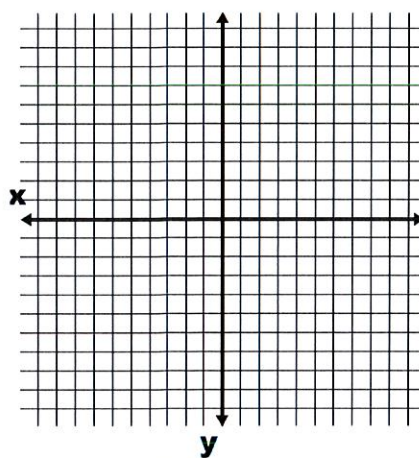
$$f(x) = 3(x + 1)^2 + 5$$

# Algebra 2

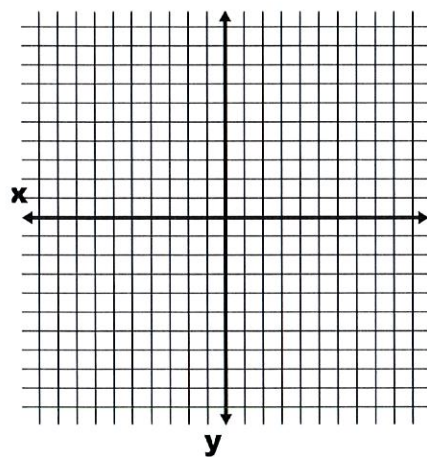
## Quadratics Day 4: Graphing Parabolas in Vertex Form



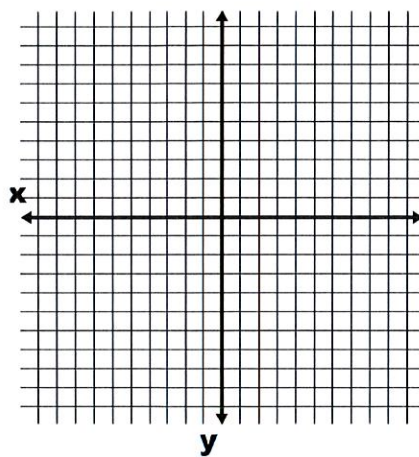
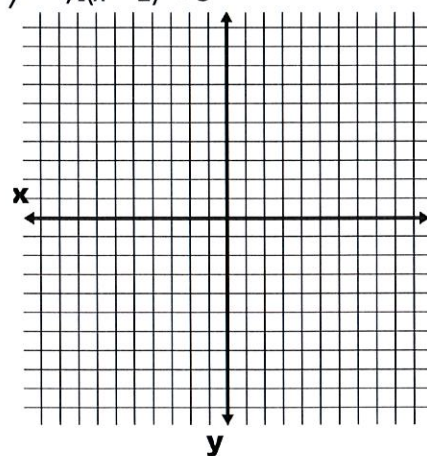
$$f(x) = -5(x - 4)^2 - 8$$



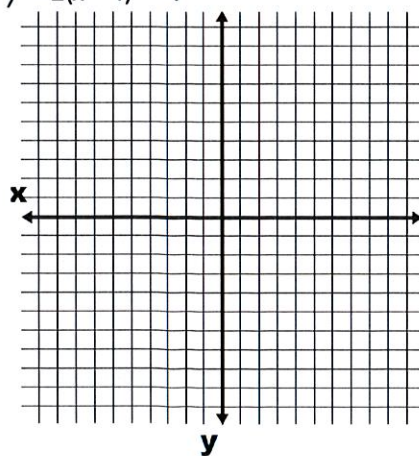
$$f(x) = 4(x + 6)^2$$



$$y = -\frac{1}{2}(x - 2)^2 + 3$$



$$y = 2(x + 1)^2 - 4$$

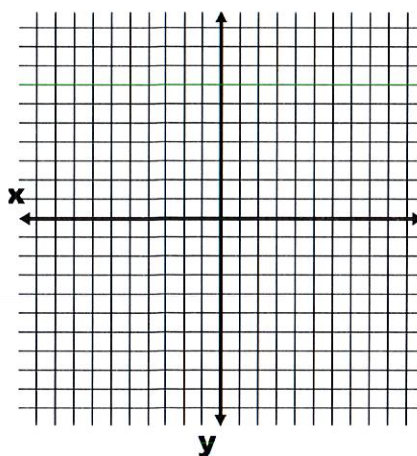
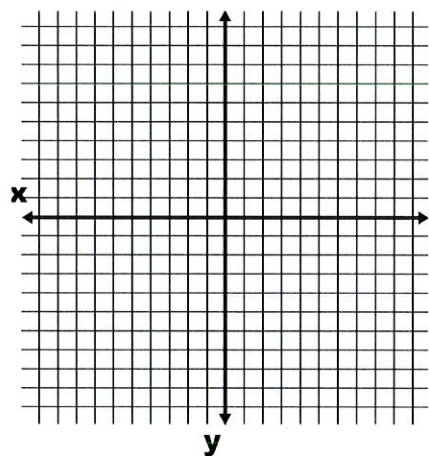


$$y = \frac{2}{3}(x + 1)^2 - 2$$

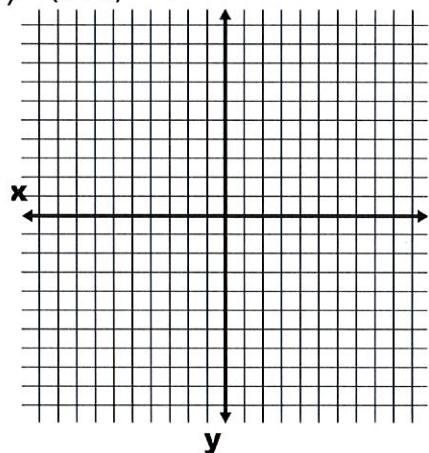
$$y = (x - 1)^2 + 2$$

## Algebra 2

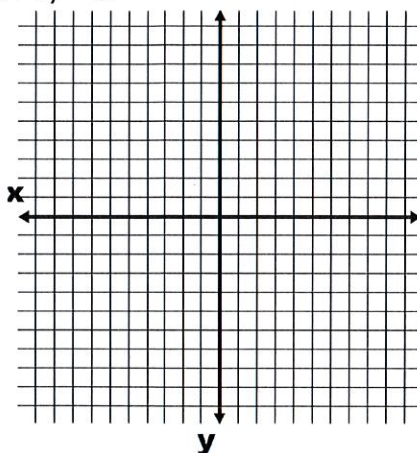
### Quadratics Day 4: Graphing Parabolas in Vertex Form



$$y = (x + 3)^2 - 4$$



$$y = -3(x + 7)^2 - 8$$



#### To Write the Equation of a Parabola:

- 1) Use the vertex form  $y = a(x - h)^2 + k$
- 2) *\*If you can figure out what  $a$  is, you are now finished!*
- 3) Substitute the vertex coordinates for  $h$  and  $k$ .
- 4) Substitute the coordinates of a point for  $x$  and  $y$ .
- 5) Solve for  $a$ .
- 6) Use  $a$ ,  $h$ , and  $k$  to rewrite the equation in vertex form

Write the equation of the following parabolas:

Vertex (3, 4); contains point (5, -4)

Vertex (2, -5); contains the point (0, -3)